"Not Yet Blindingly One": *Gravity's Rainbow* and the Hypertextualists

Stuart Moulthrop and John McDaid

Introducing a posthumous collection of writings by Donald Barthelme, Thomas Pynchon says that the book in hand offers "the do-it-yourself hypertextualist . . . a chance to browse and recombine, often with striking results" (I xv). For those of us whose work in hypertext has been deeply informed by Pynchon's fiction, this statement in itself represents a pretty striking development, not to mention a huge thrill. For starters, it logs Pynchon's name on the very short list of artworld legends who have speculated that hypertext might be worth thinking about (see also Coover and Eno). It also bolsters our suspicion that writers like Acker, Burroughs, Coover, Dick, Pynchon, Reed, Rushdie and others have developed a narrative sensibility that resonates with—or, as they say in cultural studies, *articulates to* (see Grossberg)—certain late-breaking developments in communication technology. This should not be surprising. After all, Pynchon is the writer who gave us Tyrone [Jr.?] and his fantasy of the "Electroworld":

> Maybe there *is* a Machine to take us away, take us completely, suck us out through the electrodes out of the skull 'n' into the Machine and live there forever with all the other souls it's got stored there. *It* could decide who it would suck out, a-and when. Dope never gave *you* immortality. *You* hadda come back, every time, into a dying hunk of smelly *meat!* But *We* can live forever, in a clean, honest, purified Electroworld— (GR 699)

Oliver Stone may think that William Gibson and the mirrorshade crowd invented cyberspace, but that story is strictly for the tourists. In fact, Pynchon invented the cyberpunks, with much help from Burroughs, Dick and science fiction's New Wave (see Di Filippo). Nor was this the only act of anticipation for which Pynchon deserves credit. He also said (through the character Mario Schweitar): "'Someday it'll all be done by machine. Information machines. You are the wave of the future'" (GR 258). Meaning, as any reasonable hypertextualist will admit, that Pynchon also invented *us*.

There can be no doubt that Pynchon's strange, spare body of work —not just the four novels but also the long years of silence, which may itself represent his masterpiece—articulates strongly to our digitally-

obsessed moment. It is comforting, every time the Vice President starts up about the Information Superhighway, to remember Pynchon's Zone. But we need to get our positions straight here. Mario Schweitar's prediction is fatalistic, not celebratory. The "you" who represents his "wave of the future" is Tyrone Slothrop, whose fate is far from clear. If we would articulate Pynchon's vision to electronic technologies, just what does this connectedness imply, particularly in regard to hypertext? When Pynchon uses that word in the Barthelme introduction, he implies that the technology could expose resonances and parallels in existing bodies of writing. He presents the Barthelme anthology as a latent hypertext, a network of links and paths that could be realized through clever electronic mapping. Similar suggestions are often made about Pynchon's own work, particularly the enormous expanse of *Gravity's Rainbow*. But what would it mean to recast this work in hypertextual form? Would this be a useful or interesting exercise? Would it even be possible?

Since these are the obvious questions, we can be sure they are the wrong ones. In thinking about the articulation of *Gravity's Rainbow* and hypertext, we need to address matters of greater complexity and significance—matters that go beyond literary delivery systems, touching instead the deeper concerns Pynchon raises in his fictions. We must ask about the ways various technologies have shaped our cultural moment, the options for individual response to hegemonic information systems. Taken in its full implications, this articulation asks us to consider our future in the shadow of an apocalypse which is now more immanent than imminent.

1. Between Apocalypses Just Now

The Barthelme introduction was not the first time Pynchon pointed out an emerging technological trend. Back in the momentous year 1984, he interrupted his seclusion to deliver the following forecast: "If our world survives, the next great challenge to watch out for will come —you heard it here first—when the curves of research and development in artificial intelligence, molecular biology and robotics all converge. Oboy" (L 41). While we appear to have made it through the Orwellian shadow, we still seem far from the technological convergence Pynchon foresaw a decade ago. Nineteen eighty-four was the twenty-fifth anniversary of C. P. Snow's "Two Cultures" lecture, the occasion for Pynchon's Halloween essay. It was also the heyday of the *noir* revival and of cyberpunk: Gibson's *Neuromancer* was 1984's *Nineteen Eighty-Four*. So who could blame Pynchon for getting a bit carried away by the scare quotients of artificial intelligence,

molecular biology and robotics? Consider the likely outcomes of his predicted convergence: "nanomachines" that re-engineer organisms and materials at the molecular level (see Drexler); virus-like, artificially intelligent pseudocritters capable of infesting human brains as well as computers (see Bear and Cadigan); neuro-electronic interfaces that make the fantasy of an Electroworld into practical reality. Add more immediately the looming prospect of a second Reagan term—Pynchon's essay ran the week before the 1984 election—and we can readily understand his ambivalence about the future, his sense that any number of cultures, let alone Snow's famous two, might be drifting toward disaster.

Whatever else he has been up to in his long silences, Pynchon seems to have mastered the rhetoric of prophecy. As Frank Kermode points out, when predicting the end of the world, it is best to avoid precision in the time scale (8). It can be tough to face the critics on Day Omega Plus One—or, as Pynchon's own calculus has it, "Beyond the Zero." Pynchon may yet be right about the coming technological revolution even if, at the moment, his predictions seem like whistling in the dark. He has been known to invest in these subjects for the long run. His interest in robotics was already evident in *V.* (1963) in the figures of SHOCK and SHROUD, Benny Profane's plastic compadres. There is a fair amount of molecular biology in *Gravity's Rainbow*, where, as Rudy Rucker reminds us in *Wetware*, Imipolex G provides the ultimate interface between the animal and the machine. Artificial intelligence makes a notable appearance in *Vineland*, both in the ninjettes' talking computer and in the more numinous notion of "the hacker we call God" (VId 91).

Those curves are still converging. Apocalypse, as Jacques Derrida once said, is never *now*. Survivors of the last world war once naively thought our future would be postapocalyptic, but they got it wrong, or so we devoutly hope. Instead we inhabit a space between apocalypses —nestled in the trough of two great waves, a space defined by neighboring catastrophes. As postwar modulates through postmodern, we come to understand our position in terms of neither boom nor bust, but rather as a sort of post-traumatic compulsion to repeat. "The Apocalypse is over," Charles Newman wrote at about the same time Pynchon made his technological forecast, "Not because it didn't happen, but because it happens every day" (56). Newman perhaps means "over" as much in the synchronic or Damoclean sense of immanence (over our heads) as in the diachronic sense of playing-out or imminence. It ain't over till (or while) it's over (overhead). Or as Michael Stipe always sez, "It's the end of the world as we know it, and I feel fine." The world as we know it—which is to say, our current

cognitive construct or phenomenological "thrownness"—flashes off and on again, traveling beyond the zero, with each flick of the remote control, with each refreshing of the screen, with every cycle of the simulation. Or, to change media for a moment, with the next turn of the page. As Pynchon's Superman muses, "*you know Jimmy, time—time is a funny thing*" (GR 752). Our history may be "an aggregate of last moments" (GR 149), but we have a way of muddling through, fatally time-bound though we all are at the end.

So much was clear in the mid-seventies when we first read the last words of *Gravity's Rainbow*. We saw that evening star come out over the darkened movie house, tracked its descent, witnessed the event, and started thinking about what "other orders" might be lurking behind Pynchon's last words of fiction for seventeen long years: "Now everybody—" The final line finishes with an aposiopesis, the trope of imperfection more popularly known as fill-in-the-blank, or, as Mr. Pointsman might point out, a projective test. What one chooses to project onto the end of Pynchon's world makes all the difference.

It is easy enough simply to project a projectile, filling in the blank with extinction in the absolute imperative. Having climbed to timeless apogee, Gottfried's fatal rocket may be transformed by the mandalic magic of "signs and symptoms" (or cinematic montage) into a hostile warhead closing its last gap above a theatre in contemporary L.A., final capital of Europe's deathkingdom. Read this way, the novel finishes on a great formal symmetry (*Gravity's Rainbow* indeed), the completion of a parabolic couplet: "A screaming comes across the sky" / "Now everybody has to die." Given this reading, one might speculate (hypothetically hypertextually) about the way *Gravity's Rainbow* maps onto another prophecy of the current dispensation, James Cameron's *Terminator 2: Judgment Day*. Is Arnold Schwarzenegger the ultimate incarnation of Pynchon's "Badass" (a figure celebrated in the 1984 essay)? Do the weird father/son dynamics of the film connect typologically to the "Oedipal situation" in the Zone (GR 747)? Or to ask the most literal of questions, does Industrial Light and Magic's model apocalypse (the firestorm sweeping through the L.A. basin, the bodies turned to ash and then to flying dust) visualize what comes after Pynchon's broken line?

But of course, as the lords of Hollywood have taught us to pray, that was *only a movie*. The holocaust vision remains a mere special effects sequence, bracketed off as Sarah Connor's nasty abreaction. Perhaps the same might be said for Pynchon's ambiguous ending. The last words of *Gravity's Rainbow* are not the end of something (in the real world), but the beginning of interpretation. Or, as one of us says in song:

I thought gravity was a rainbow
But it's only shades of gray

The book we know as *Gravity's Rainbow* had a different designation at first, *Mindless Pleasures*, an act of naming that greatly complicates any nihilist mis(sile)reading. Strictly speaking, the "everybody" of the final line refers to a bunch of "old fans who've always been at the movies" restlessly waiting for the show to begin: "The film has broken, or a projector bulb has burned out" (760). Technology has broken down, as it always will, leaving us susceptible to other revelations. In the absence of our favorite mindless pleasure, we fans have to fall back on a more antique entertainment, a community sing. The text is "one They never taught anyone," William Slothrop's heretical hymn for the Preterite. The verses contain a vision of Judgment that concludes "With a face on ev'ry mountainside, / And a Soul in ev'ry stone" (760). To be sure, this is a prophecy of extinction, alluding perhaps to the images of human bodies burned into the landscape of Hiroshima (Rhodes 715). But it also indicates persistence Beyond the Zero, the return of spirit to the mineral strata of "Earth's mindbody" (GR 590)—not transcendence perhaps, but at least return, a vindication of the ecological cycle the insidious They have tried to abrogate. Reading through this mystical subtext in the hymn, we could fill in the aposiopesis with a more humane predicate: "Now everybody *sing*."

The apocalypse we thus invoke (while still universally mortal) would have as much to do with continuity and justice as with the end of the world as we know it. This endpoint might represent the cultural *memento mori* or "rhetorical" apocalypse both Newman and Derrida find immanent. Or it might echo the ironic, darkly comic apocalypse revealed in yet another film, one which has its own choral finale—the end of Stanley Kubrick's *Dr. Strangelove*:

We'll meet again
Don't know where
Don't know when
But I know we'll meet again
Some sunny day

Like William Slothrop's hymn, Kubrick's anthem reminds us that the end has fallen into the middle of things, for which reason we need to learn something about the Bomb—if not to love it, then at least to come to terms with it. In an age when we can see little difference between "another postmodern sunset" (as Don DeLillo calls it) and that thermonuclear fireball, then we are sure to meet again, old fans and

cold warriors alike, doomed as we are to repetition. The logic of our moment seems to lie not in conclusion but in extenuation, not in extinction but in return or *recursion*—if not the cosmic return of Judgment Day, then the more banal recycling of our daily dread. Though always in a sense impending, the Bomb has not yet befallen us. The final line of *Gravity's Rainbow* was not the last word on the west. Everybody did not blank out or die; instead, we have carried on singing. Nixon and his tin soldiers came and went, as did Reagan and the yuppie horde and more recently the apostles of New World Order. History continues to unfold. Perhaps the ultimate horror still lies ahead of us in K. Eric Drexler's "grey goo scenario," where renegade nanomachines boil all organic life down to simple hydrocarbons. But for the moment at least, we seem to enjoy a pause between attacks of *technologique*. "Yessir, that's technology," Norman Mailer wrote even as Pynchon was working on *Gravity's Rainbow*, "that's where the box office is—the century is so full of dread at the godlike proportions man has assumed, that the only cure for dread is to extirpate every taboo and see which explosions fail to come" (148–49). This is how we proceed, then, uprooting and awaiting, testing the limits of the system and contemplating the explosions that—fortune prevailing—do not come.

2. The Computer is the Bomb under Reversal

Within this dread-filled gap is a space for new technologies. Sherry Turkle has observed that two great transforming (or, we might say, apocalypse-forming) inventions have come out of the Second World War: the nuclear bomb and the digital computer (65). This is an enormously profound statement, though Turkle does not seem to see all its implications. The Bomb and the Computer are not just milestones on the technological highway, as the dark dream of Progress tries to persuade us. These two technologies *are articulated according to a specific cultural logic*—the same double logic implicit in Pynchon's ambivalent ending. The Bomb and its apocalypse embody the most recent punctuation of equilibrium, the crisis of culture and technology from which the age of informatics derives both its origins and its agenda (see Lyotard and De Landa). Atomic weapons can be seen as the final word in a syntax of industrial evolution: *Devices devised to end all devising, full stop*. In Marshall McLuhan's terms, the Bomb marks the point at which the great "medium" of modern technology turns back on itself, passing from very hot indeed (thermonuclear) through a "break boundary" or paradoxical inversion, phasing over to postmodern supercool (49). Having come up with that

terminally bright idea, the nuclear arsenal, the west has found it necessary to roll out a more sustainable product line: not the Doomsday Machine, but the information machine. As McLuhan taught us, every medium embodies a message. What then does the computer portend? What is its revelation or apocalypse? One answer, of course, is Pynchon's ironic "Oboy"—here comes a new explosion of manufacturing techniques and strategic outcomes. Perhaps this implies a retaliatory blast that finally does come, laying the foundation for a new power balance, no doubt brought to you by those same ol' boys (Bloody Chiclitz, Captain Blicero, Dr. Strangelove) who gave us the military-industrial complex. Perhaps this is an end of the world about which we cannot feel fine.

But these dark speculations are not the only answer, and indeed, for the short run, they are not very interesting. In the next decade at least, Pynchon's triad of artificial intelligence, microbiology and robotics seem unlikely to close their conceptual gaps. As Drexler points out in his forecast of nanotechnology, the immediate moment belongs not to manufacturing but to semiotic technologies—not yet to engines of creation but to systems of communication. Among the most important of these systems Drexler includes hypertext (217). Hypertext and other forms of interactive media are definitive expressions of the time between apocalypses. They represent an anxious, momentary equilibrium on the cusp of world-changing upheaval. In terms of cultural evolution, interactive media—and indeed, information systems more generally—articulate to atomic weapons through inversion or reversal. In the imminent or threatened apocalypse of thermonuclear war, the world as we know it diminishes to zero. We have learned this scenario by heart. If someone pushes the Button, the apparatus of civilization will be wrecked, complex organisms will be wiped out, even the written record will perish, as Derrida notes with perverse delight (26). But in the apocalypse—or apotheosis—of interactive information technologies, precisely the opposite happens. The world does not collapse to a null point; instead, it implodes Beyond the Zero in a process of frenetic reproduction or simulation which opens virtual worlds of apparently infinite extent. *World* $=> 0$ is replaced by *Worlds* $=> \infty$. Or, as we say in cyberspace, *worlds without end, oboy*.

We might contrast the suspended ending of *Gravity's Rainbow* with a decidedly different moment of revelation. This one is found in Don DeLillo's *White Noise*, in many respects a dialectical complement of *Gravity's Rainbow*. Like *Dr. Strangelove*, Pynchon's novel shows us how deeply we have devoted ourselves to the culture of catastrophe. *White Noise* traces a later stage of this romance, well beyond the

reversal of the overheated medium—the same stage Pynchon explores in *Vineland*. The third sentence of *Gravity's Rainbow* notes, "It is too late" (3). *Vineland* begins, "Later than usual" (3). *White Noise* unfolds in this time of acute belatedness. DeLillo is fascinated in his own way with organic chemistry, conspiracies ("All plots tend to move deathward"), and "German names, the German language, German *things*." But in DeLillo's imagination, paranoid historicism turns to postmodern pastiche. "In the middle of it all is Hitler, of course" (63), DeLillo's protagonist insists; but this is not Pynchon's Hitler, the "dark companion" whose ghost haunts Edward Pointsman. It is instead the cartoon hero of "Hitler Studies," a relentlessly mediated image who has turned into a limp semiotic token interchangeable with Elvis Presley.

Gravity's Rainbow marks the boundaries of the old, nuclear-apocalyptic, industrial order. *White Noise* charts the strange spaces that subsequently come into being. The first part of the novel ("Waves and Radiation") closes with an epiphany which clearly illustrates the difference between these two domains. While channel-hopping around their local cable system, the narrator and his adopted son happen across a live broadcast involving the boy's mother. This moment, like most in the novel, literally radiates significance:

> It was the picture that mattered, the face in black and white, animated but also flat, distanced, sealed off, timeless. It was but wasn't her. . . . Waves and radiation. Something leaked through the mesh. She was shining a light on us, she was coming into being, endlessly being formed and reformed as the muscles in her face worked at smiling and speaking, as the electronic dots swarmed.
>
> We were being shot through with Babette. Her image was projected on our bodies, swam in us and through us. Babette of electrons and photons, of whatever forces produced that gray light we took to be her face. (104–05)

Not a rainbow, but shades of gray, which may well be DeLillo's favorite fictive color. Like Pynchon's Tyrone Slothrop, DeLillo's Babette Gladney has been "broken down, and scattered" (GR 738). Yet this process is not a disappearance, as in Slothrop's case (and perhaps Pynchon's), but quite the opposite: it is a simulacral enhancement of presence ("Something leaked through the mesh"). The image matters, or becomes material. Like the Bomb, television technology appears to translate matter into energy, particles into "waves and radiation," corporeal Babette into "electrons and photons." But unlike the Bomb, television preserves the image as more than just an accidental face on the mountainside; and while it may bombard or irradiate its viewers, it

leaves all its subjects more or less intact, in a physical sense at least. This technology respects informational or mimetic identity. It is dedicated, not to destruction, but to communication and consumption —not to the "hot" agenda that would reduce the world to uniform Zero, but to the "cool" outcome of a relentlessly expanding reality. Less Global Village, perhaps, than the Garden of Forking Paths.

Certainly there is something unsettling, not to say sinister, about this whole process. McLuhan was quite right to observe that broadcast technologies would re-awaken tribal or animistic impulses. Watching his wife on the tube, Jack Gladney first assumes she is dead: "Was this her spirit, her secret self, some two-dimensional facsimile released by the power of technology, set free to glide through wavebands, through energy levels, pausing to say good-bye to us from the fluorescent screen?" (104). To be televised is to suffer a see change, to sink beneath the wavebands and emerge as a million points of light, enriched and estranged. Jack responds with a "two-syllable infantile cry, *ba-ba*," that comes "from the depths of my soul." Babette's son, significantly named Wilder, shows a very different response: "Only Wilder remained calm. He watched his mother, spoke to her in half-words, sensible-sounding fragments that were mainly fabricated. As the camera pulled back . . . Wilder approached the set and touched her body, leaving a handprint on the dusty surface of the screen" (105). Wilder is indeed wilder than anyone else in the Gladney household, closer to some version of the primitive. A five-year-old with a 25-word vocabulary, he shows signs of autism or developmental impairment. His parents cherish him because they believe he still has an infant's ignorance of death. Yet it is Wilder who brings home the meaning of Babette's apparition and the full implications of its mediation. Wilder talks to the image on the screen, like his adoptive father, using a glossolalia or *Ursprach*; but unlike Jack, Wilder is not talking to himself. At least at first, he does not discriminate the virtual presence of his mother from the real. So the wild child reaches out and touches the screen, attempting to complete the circuit between body and image, original and simulacrum. This overture fails (as the handprint on the screen graphically demonstrates), and Wilder is left "crying softly, uncertainly, in low heaves and swells" (105). Nonetheless, his attempt at contact reveals a deep truth about mimetic technology. The scattering or broadcasting of the image is only an initial seduction. This technology tends, not simply to reproduce images of the real world, but to simulate, at least on the audiovisual level, richly articulated sensory environments. These environments demand, not just rapt attention or passive consumption, but *interactive response*. In a sense, many of us, old fans who've always been in the

TV room, have always wanted to reach out to that Mother on the screen—or to the welcoming space beyond the screen William Gibson tellingly names Matrix, *techno-magna mater*. Television, McLuhan noted, is an involving and implicating technology. He did not know the half of it.

The video screen is only the beginning, just the elementary incitement or primary come-on. The full fetishism of the new romance can flower only when we supplement imaging and broadcasting with robust facilities for input and response. The key to the reversal of Bomb technology and the expansion of perceptual reality lies, not in television alone, but in interactive information technologies. When fully elaborated (perhaps only after Pynchon's terrible convergence), these technologies will make terms like "television" and "computer" seem as quaint and meaningless as "wireless," "icebox" and "horseless carriage." Most likely, they point toward the electrofreak dream of cybernetic abduction. There are, of course, wavehead wannabes working very hard right now to bring this dream to market (see Moravec). At the moment, however, our interactive information systems have not yet reached these wild horizons. We have only glimmerings of what may be coming, in technologies like virtual reality systems, interactive multimedia environments and, at the foot of the glamour scale, hypertext. Which is how we return, by a very commodious vicus, to our first concerns. How does the text of Pynchon's apocalyptic novel articulate to interapocalyptic practices like hypertext?

3. Into a New Age

Jay David Bolter, an influential developer and theorist of hypertext systems, offers a simple, direct answer for questions of this kind: "The computer is simply the technology by which literacy will be carried into a new age" (WS 237). If we take Bolter at his word, then we must regard hypertext as a marginal advance on recent writing technologies —little more, really, than the cross-fertilization of the word processor and the database. This might be a plausible position given the conservatism and instrumentalism which seem to dominate most hypertext work so far (see Baird-Davenport). But we can easily move beyond this limited view. Practically speaking, Bolter's notion of literacy transfer suggests two main types of hypertextual application for literary studies. The most elementary would be a compendium of textual resources on the model of Landow and Lanestedt's *Dickens Web* (see Landow) or Harvard University's *Perseus Project* (see Crane). A *Gravity's Rainbow* web would include the primary text, any draft and

source material that could be discovered, a comprehensive gathering of scholarship on the novel, bibliographic apparatus, and at least a sampling of related or implicated texts—which in this case would dwarf the other parts of the project. All these elements would be deployed within a framework that included specific links, facilities for developing new connections, and a "navigation" scheme for representing the structure of the information base and allowing users to move within it. The web would be designed to provide scholars engaged in research on *Gravity's Rainbow* with a collection of existing work and with a tool for organizing and synthesizing that large body of resources. We might think of this model as an *industrial* application of hypertext—in the sense of "the Shakespeare industry," "the Joyce industry" or "the publishing industry."

Industrial hypertext can make no claim to innovation, since it simply supplies an information-retrieval system for a body of conventional writing. However, even without discarding familiar notions of literacy, we might conceive of more challenging implementations of hypertext for literary interpretation and response. The designer and theorist Michael Joyce proposes a two-part division for hypertext projects. The industrial hypertext we have just outlined would fit more or less neatly into Joyce's category of "exploratory" hypertexts, closed information systems where the user's transitions from one body of writing to another are prescribed either by specific routes of connection ("paths") or through a constrained scheme of search possibilities. As an alternative to this approach, Joyce posits "constructive" hypertexts, freely evolving, open-ended "structure[s] for what does not yet exist" (12). Constructive hypertexts, the idea for which evolved out of Joyce's work in developmental writing classes, do not present a definitive or authoritative body of knowledge in the way compendia or scholarly editions do. They embody information as a mutable, expansible "writing space" with no final shape or boundaries (Bolter, WS 11). In the constructive conception, every user becomes Pynchon's "do-it-yourself hypertextualist." Such schemes seem particularly well suited to research teams, writing groups and other collaborative enterprises (see Malcolm et al.).

The industrial web model and the constructive collaboration model are by no means mutually exclusive. One of us created, as an early experiment in constructive hypertext, a hypertextual annotation system for use by an undergraduate seminar encountering *Gravity's Rainbow* for the first time. The resulting electronic collaboration (see Moulthrop, "Hyperbola") combines elements of literary industry (traditional academic commentary on the novel) with elements of constructive writing (the ability to network links through both the main text and the

commentaries), suggesting a form of hypertext that exploits possibilities for dynamism and openness while retaining the centrality of the original, print-based writing.

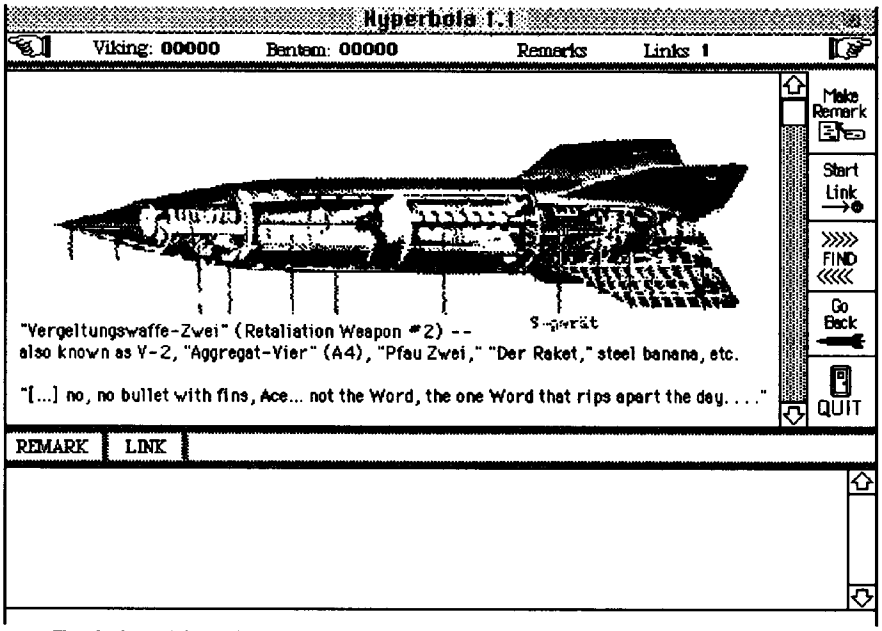

Fig. 1: A card from the "Hyperbola" stack

But if at this point the reader has begun to notice a certain gap or discord in our discussion, she is absolutely right. The hypertext applications we have just outlined here—both the traditional, industrial model and the more experimental or constructive alternative—seem a far cry from the radically expansive, deeply interactive communications practices we invoked in portraying information technologies as a reversal of nuclear apocalypse. Without much acknowledgment, we have moved from culture in the large sense to the decidedly narrower space of the classroom or the academic study. In this regard, a more pointed illustration may be appropriate (see Fig. 2 below). Keeping our noses buried in the "Holy Text" while data pours down the screen (and the night unfolds beyond our window) makes us look foolish indeed. So perhaps we need to refine our approach here. How can we suggest that the articulation of *Gravity's Rainbow* to hypertext is simply a matter of literacy transfer when this conjunction clearly involves issues of much greater scope and complexity? We need to re-focus our attention—to begin with, by reconsidering Bolter's soothing counsel

about computers and the future of writing. *The computer is simply the technology by which literacy will be carried into a new age*. What does this statement mean? In what sense is it true, and what deeper truths does its apparent simplicity conceal?

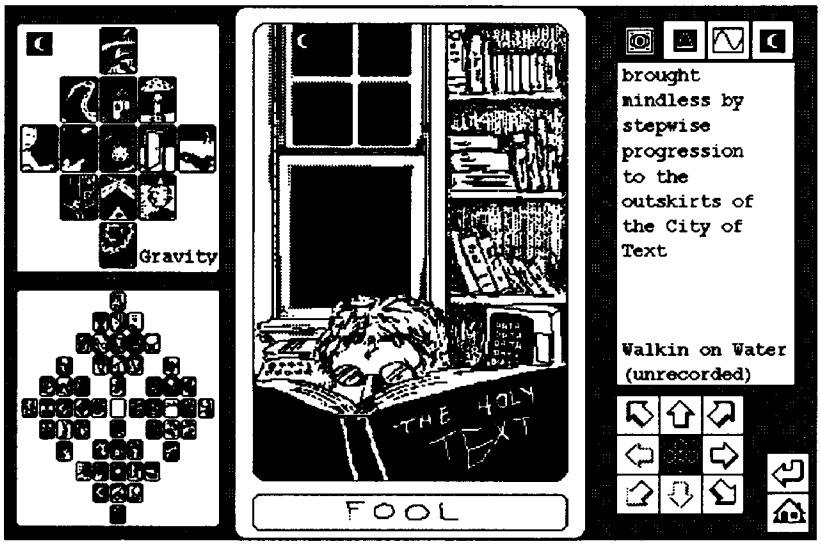

Fig. 2: From the "Oracle" stack in McDaid's *Uncle Buddy's Phantom Funhouse*

Begin at the beginning. What does "the computer" mean, and what is it likely to mean in the remaining years of this century? Hypertext systems are already distributed across a bewildering range of platforms: IBM-family and Macintosh personal computers, UNIX workstations, and a wide variety of mainframe systems. Some standards have been proposed for hypertext environments (for example, SGML, the markup language used widely in the text-retrieval industry; and HTML, an extension that allows hypertext to propagate across the Internet). Still, no consensus has emerged. Nor does a stable convention seem likely, since the nature of interactive media is heavily influenced by hardware and software development. The recent surge of interest in interactive graphics and virtual reality systems can be instructive here. If, as Bolter argues, information machines require us to re-think textuality in spatial terms, then we can surely expect a convergence of hypertext with these simulated sensory environments. Bolter himself has recently proposed this (see his "Virtual Reality"). "The computer," then, is likely to mean, not just a computational

engine (though it will certainly retain that function), but rather an information-processing device operating across multiple media. This shift in metaphors carries important consequences. While "horseless carriage" remains a valid description of the automobile, it hardly suggests the range of uses or performance potential of that technology. We can probably expect the term "computer" to suffer a similar obsolescence as we come to use the device less as an analytical engine than as a medium of communication.

We might also raise some questions about Bolter's use of "literacy" —a notoriously vague idea even when writing technologies are not in rapid flux, but particularly contestable now (see Tuman). Literacy has traditionally been defined in terms less of production than of reproduction, the ability to replicate certain established modes of interpretation and textual practice. But developments like Joyce's constructive hypertext, as well as a growing interest in collaborative work in the general marketplace, greatly complicate this notion (Kaplan 12). What kind of literacy does Bolter see surviving into his "new age"? Is it a literacy which still takes the printed page and the codex book as its defining artifacts? Though conceived for electronic display, the hypertext applications we have outlined maintain a strong allegiance to the conventional, printed text of Pynchon's novel. They assume the reader has come to the industrial or constructive text in the time-honored way, by reading the book first. Will this necessarily be the case?

Finally, we could examine the process of "carrying" or transferral by which Bolter sees literate practice moving from the present into the future. Does this carryover imply a direct translation, or will the text be altered in the process? Clearly there would be an important difference between *Gravity's Rainbow* delivered as a conventional book and its instantiation in a hypertextual research compendium. Word-for-word, the two texts would be identical; but the latter would be complicated by the presence (visible or latent) of link, annotation and reference markers, indicators of complex discursive relations. A few years ago, the Voyager Company launched an ambitious line of print-to-electronic conversions under the trademark "Expanded Books." More recently, another vendor announced a line of "electronic paperbacks," low-cost book-to-bitstream conversions (see Jacobs). Such products represent only a rudimentary application of hypertext (mainly for annotation and cross-reference, as in the "Hyperbola" stack), but they do raise questions germane to this technology. What does it mean to "expand" a book in electronic media? Does this process transform the fundamental experience of reading? Since there cannot be any perfect correspondence between texts in old and new

media, should we be committed to reproducing any features of the book at all?

Suppose we subject Bolter's metaphor of "carrying" to a little expansion or re-interpretation. Perhaps the notion of cultural reproduction it implies is not so simple after all. We might consider the passage from print to hypertext less translation than *gestation*: what we carry (to term) might be, not copy, but progeny, an entirely new conception with its own destiny and its own course of development. Of course there are bound to be resemblances to the parent text, but after delivery the two entities would become distinct. Hypertext might serve, not simply as an adjunct to or apparatus of print culture, but as an independent sphere of cultural work.

4. Articulations

To some extent, this reconception rules out any meaningful exchange between *Gravity's Rainbow* and hypertext. The articulation of print fiction and electronic writing might well be a null domain: the interface as chasm or brick wall. Print, as critics like McLuhan, Ong and Eisenstein have argued, is an industrial technology, not just in the academic sense of specialized discourse communities, but also in the broader, modern sense of linear and hierarchical organization. To the degree that hypertext belongs to a postindustrial or interapocalyptic regime, it differs sharply from the literary and cultural sensibilities that produce monolithic, monologic texts like novels in *Gravity's Rainbow*'s preterite line. If we cannot faithfully transfer or translate Pynchon's novel into the electronic medium, this might indicate a fundamental mismatch or disparity between genres and media.

But this analysis, like the notion of literacy transfer, errs on the side of simplicity. After all, *Gravity's Rainbow* is hardly a typical or conventional work of fiction. The novel may be monumental, but can we really call it "monologic"? If, for instance, we view *Gravity's Rainbow* as an "encyclopedia" in Edward Mendelson's sense, then it marks an extreme or limit case for cultural production under the industrial order (161). Alec McHoul and David Wills are no doubt right in calling the novel "post-rhetorical," incommensurable with any univocal, humanist logic (62–63). Consider the novel's multicultural babel of languages and voices, or the general anonymity of its narrative persona, or the extension of that anonymity into the professional behavior of Thomas Ruggles Pynchon, the consummate author-under-erasure. *Gravity's Rainbow* defines (or unfinishes) itself in terms of enigma, a narrative undecidability that teaches us how mindless a pleasure Holy-Center-approaching really is (Hite 131). The novel

concludes with a trope of imperfection, indicating an apocalypse or revelation that might be read in diametrically opposite ways—a structure quite common in recent electronic texts.

If we understand *Gravity's Rainbow* in these terms, then perhaps its articulation with hypertext and other forms of interactive communication might not be so empty after all. In fact, as both of us have previously argued, *Gravity's Rainbow* holds an essential message for anyone engaged with new media (see McDaid, "Planes"; Moulthrop, "Polymers"). Though by no means uncomplicated, that message can be roughly captured in a single word: *paranoia*. The paranoid gnosis of *Gravity's Rainbow* provides an important interpretive practice for designers, producers and receivers of interactive media. Among other things, it supplies a powerful agenda for social/textual analysis. By sensitizing us to "other orders behind the visible" (GR 188), Pynchon's narrative reminds us that structures are often invisible, latent or concealed, and that the domain of real control is ultimately a realm beyond—which is where the gnosis part comes in. In the case of exploratory or "robotic" hypertexts, this realization might inform, not just local interpretive practices, but a whole new cultural literacy (see Moulthrop, "Hyperreal"). Paranoia as Pynchon (or Leni Pökler) defines it also emphasizes non-sequential, parallelistic modes of perception, an ability to appreciate "'Signs and symptoms. Mapping on to different coordinate systems'" (GR 159). Such connectivity closely resembles the underlying logic of linked discourse, the kind of "non-sequential writing" and thinking for which hypertext was invented (see Nelson).

But above all, *Gravity's Rainbow* suggests, in form as well as content, that the more elaborate and convoluted a system becomes, the further it recedes from any prospect of closure. Our most important lesson about paranoia concerns its essential *liminality*:

> About the paranoia often noted under the drug, there is nothing remarkable. Like other sorts of paranoia, it is nothing less than the onset, the leading edge, of the discovery that *everything is connected*, everything in the Creation, a secondary illumination—not yet blindingly One, but at least connected, and perhaps a route In for those like Tchitcherine who are held at the edge. . . . (703)

What is true for Vaslav Tchitcherine on his Oneirine trips holds equally true for any user of advanced information systems, whether they be virtual reality environments, hypermedia webs or even electronic mail (Bolter, WS 29). (Virtually) everything would seem to be connected or at least connectable, articulated in some way to a master program or fundamental logic—a universal simulation, a matrix of associations, or

perhaps just a network of electronic senders and addressees. Our naive tendency when facing such technosocial prodigies is often to accept them as valid simulacra of the natural order, or at least some large part of it. Media generate invisible networks of perceptual influence, or "environments," as McLuhan called them (33). Machinery tends to "narcotize" the user, and thus to render itself invisible. When fully elaborated, technology may look less like magic than like physical law. Yet behind every machine lies a machination (Latour 129). A healthy technological paranoia would correct this delusive tendency by reminding us that the apparent unity of the immachinate or simulated world is always incomplete, asymptotic—"not yet blindingly One," no matter how elaborate its connections.

The paranoid perceiver follows a "route In" that appears to lead to higher levels of organization, domains of greater influence where the ratio of signal to noise is higher. In the case of interactive media, this means penetrating the apparent closure of the system to investigate its protocols and secrets. Yet paranoia always situates the perceiver in a liminal or threshold position, "held at the edge" of total revelation no matter how far In one is able to go. The perceiver can never fully understand a paranoid system; she can only map its signs and symptoms against various coordinate systems. Again, there is a direct articulation here between the paranoid hermeneutic of *Gravity's Rainbow* and the kind of technological interpretation demanded by interactive media. As readers/users of complex technologies, we must be prepared to violate the closure of any construct. This might mean simply being ready to operate on the kinds of links or representations provided in a given application, a willingness to regard the text as Joyce's "structure for what does not yet exist." But it also might require an ability to intervene on a higher level, a willingness to reverse-engineer—to decompile as well as deconstruct.

In this regard, we might define at least provisionally the articulation between *Gravity's Rainbow* and the emerging information technologies of which hypertext is but one instance. Pynchon's novel is probably not a latent hypertext, nor is it likely to be a promising subject for hypertextual translation. Nonetheless, it should be required reading for all serious textual engineers. We might well regard *Gravity's Rainbow* as a sort of gospel of creative paranoia—Oxyrhynchus papyrus number (or Internet address) classified. There is a lot to learn from the adventures of Slothrop, Enzian, Tchitcherine and Leni Pökler—even from Mexico, Pointsman and Seaman Bodine. Their narratives might help us see clearly the various edges at which we are held. These days, that may be the most important conceptual exercise we can undertake. The more adept we become in exploiting our liminality, the

greater our chances of averting any fall into the blindingly One. The better we are at taking systems apart (or, as Mailer says, extirpating taboos), the less risk we run of explosions that actually come. *Gravity's Rainbow* defines our place in history as a zone of the interior or a moment in-between. It might also give us the mental tools to hold that place for the foreseeable future.

—*Theoretically Infinite Narrative Art Collective*

Works Cited

Baird, Patricia and Elisabeth Davenport. "Hypertext—A Bibliometric Briefing." *Hypermedia* 4.2 (1992): 123–34.

Bear, Greg. *Blood Music*. New York: Arbor House, 1985.

Bolter, Jay David. *Writing Space: The Computer, Hypertext, and the History of Writing*. Hillsdale, NJ: Lawrence Erlbaum, 1991.

---. "Virtual Reality and the Future of Hypertext." *Proceedings of the ACM Conference on Hypertext, Milano, Italy, November 30–December 4, 1992*. Ed. D. Lucarella et al. New York: Association for Computing Machinery, 1992. 2.

Cadigan, Pat. *Synners*. New York: Bantam Spectra, 1991.

Coover, Robert. "The End of Books." *New York Times Book Review* 21 Jun. 1992: 1, 23–25.

Crane, Gregory. "From the Old to the New: Integrating Hypertext into Traditional Scholarship." *Hypertext '87 Proceedings: Papers Presented at a Workshop November 13–15, Chapel Hill, North Carolina*. New York: Association for Computing Machinery, 1989. 51–56.

De Landa, Manuel. *War in the Age of Intelligent Machines*. New York: Zone, 1991.

DeLillo, Don. *White Noise*. New York: Viking, 1985.

Derrida, Jacques. "No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)." *Diacritics* 14.2 (1984): 20–31.

Di Filippo, Paul. "Who Are the 50 Most Powerful People in Science Fiction?" *Science Fiction Age* 1.5 (1993): 24–27.

Dr. Strangelove: or, How I Learned to Stop Worrying and Love the Bomb. Dir. Stanley Kubrick. Columbia, 1963.

Drexler, K. Eric. *Engines of Creation*. New York: Anchor, 1986.

Eno, Brian. "Brian Eno on *Writing Space*." *Artforum* Nov. 1991: 13–14.

Gibson, William. *Neuromancer*. New York: Ace, 1984.

Grossberg, Lawrence. *We Gotta Get Out of this Place: Popular Conservatism and Postmodern Culture*. New York: Routledge, 1992.

Hite, Molly. *Ideas of Order in the Novels of Thomas Pynchon*. Columbus: Ohio State UP, 1983.

Jacobs, Todd A. "Electronic Books Go 'Paperback.'" Blam!! press release, 10 Mar. 1994.

Joyce, Michael. "Siren Shapes: Exploratory and Constructive Hypertext." *Academic Computing* 3.4 (1988): 10–14, 37–42.

Kaplan, Nancy. "Ideology, Technology, and the Future of Writing Instruction." *Evolving Perspectives on Computers and Composition Studies: Questions for the 1990s*. Ed. Gail E. Hawisher and Cynthia L. Selfe. Urbana, IL: NCTE, 1991. 11–42.

Kermode, Frank. *The Sense of an Ending: Studies in the Theory of Fiction*. New York: Oxford UP, 1967.

Latour, Bruno. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard UP, 1987.

Landow, George P. *Hypertext: The Convergence of Contemporary Critical Theory and Technology*. Baltimore: Johns Hopkins UP, 1992.

Lyotard, Jean-François. *The Postmodern Condition: A Report on Knowledge*. Trans. Geoff Bennington and Brian Massumi. Minneapolis: U of Minnesota P, 1984.

Mailer, Norman. *Of a Fire on the Moon*. 1970. New York: NAL Signet, 1971.

Malcolm, Kathryn C., Steven E. Poltrock and Douglas Schuler. "Industrial Strength Hypermedia: Requirements for a Large Engineering Enterprise." *Hypertext '91: San Antonio, Texas, December 15–18, 1991: Third ACM Conference on Hypertext Proceedings*. New York: Association for Computing Machinery, 1991. 13–24.

McDaid, John. "The Planes: A Decoupled Monomeric Hypernarrative." *Writing on the Edge* 2.2 (1991): 139–49.

---. *Uncle Buddy's Phantom Funhouse: A Hypermedia Novel*. Cambridge, MA: Eastgate, 1993.

McHoul, Alec and David Wills. *Writing Pynchon: Strategies in Fictional Analysis*. Urbana: U of Illinois P, 1990.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: McGraw-Hill, 1964.

Mendelson, Edward. "Gravity's Encyclopedia." *Mindful Pleasures: Essays on Thomas Pynchon*. Ed. George Levine and David Leverenz. Boston: Little, Brown, 1976. 161–95.

Moravec, Hans. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, MA: Harvard UP, 1988.

Moulthrop, Stuart. "Hyperbola." Unpublished hypertext, 1989. [Available by file-transfer protocol download ("anonymous ftp") from http://raven.ubalt.edu/moulthrop/hypertexts/hyperbola.html]

---. "Hypertext and 'the Hyperreal.'" *Hypertext '89 Proceedings: November 5–8, Pittsburgh, Pennsylvania*. New York: Association for Computing Machinery, 1989. 259–68.

---. "Polymers, Paranoia, and the Rhetorics of Hypertext." *Writing on the Edge* 2.2 (1991): 150–59.

Nelson, Theodor Holm. *Literary Machines: The Report on, and of, Project Xanadu*. Sausalito, CA: Mindful, 1990.

Newman, Charles. *The Post-Modern Aura: The Act of Fiction in an Age of Inflation*. Evanston, IL: Northwestern UP, 1985.

Pynchon, Thomas. *Gravity's Rainbow*. New York: Viking, 1973.

---. Introduction. *The Teachings of Don B.: Satires, Parodies, Fables, Illustrated Stories, and Plays*, by Donald Barthelme. Ed. Kim Herzinger. New York: Turtle Bay, 1992. xv-xxii.

---. "Is It O.K. to Be a Luddite?" *New York Times Book Review* 28 Oct. 1984: 1, 40–41.

---. *Vineland*. Boston: Little, Brown, 1990.

Rhodes, Richard. *The Making of the Atomic Bomb*. New York: Simon & Schuster, 1986.

Rucker, Rudy. *Wetware*. New York: Avon, 1988.

Terminator 2: Judgment Day. Dir. James Cameron. Tri-Star, 1991.

Tuman, Myron C. "First Thoughts." *Literacy Online: The Promise (and Peril) of Reading and Writing with Computers*. Ed. Myron C. Tuman. Pittsburgh: U of Pittsburgh P, 1992. 3–15.

Turkle, Sherry. *The Second Self: Computers and the Human Spirit*. New York: Simon & Schuster, 1984.